DISTRIBUTION LAW FOR PARTICLE FRAGMENTATION TIMES IN A THEORY FOR STRIATED TAILS OF DUST COMETS: APPLICATION TO COMET HALE-BOPP (C/1995 01)

Z. SEKANINA[1] and J. PITTICHOVÁ[2,3]

[1]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif., U.S.A.
[2]European Southern Observatory, Garching bei Munchen, Germany
[3]Astronomical Institute, Slovak Academy of Sciences, Bratislava, Slovakia

The original model for the striated dust tails of comets (Sekanina & Farrell 1980) describes the formation and evolution of the striae as a two-step fragmentation process that is characterized by the ejection time t_e of parent particles, by their radiation pressure acceleration β_p, and by their fragment at ion time t_f ." It is known that of these three, the time t_f is the weakest parameter in that a range of t_f offers nearly equally successful solutions. In this work we" propose a truncated Gaussian function as a first-approximation distribution law for the fragmentation times. We apply this generalized model to the images of several striae in comet Hale-Bopp, detected on 'March 12–15, 1997 and analyzed by Pittichová et al. (1998). It is found that a distribution of fragmentation times over a period of up to a few days is consistent with the observed images, providing quantitative information on the relaxation of the fragmentation-time constraint.